















# SUMMARY

## SUMMARY

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# SECONDARY INJECTION TEST CASE

150V

12.5A

3U  
3I

## High accuracy electronic generator :

- 3 Voltages up to 150Vac - 50VA
- 3 Current up to 12.5Aac - 100VA max

## Converter input :

- 1 Input 0/20 mAdc
- 1 Input 0/10 Vdc

## Only working with PTRPILOT software :

- Driving mode thanks to the PTRPILOT software running on Windows XP/NT/Vista/7.

**Dimensions and Weight reduced**  
**Transducer and Converter tests**



Picture for illustration purposes only.

DTR133 / 033

## • Packaging

- Laboratory box with a handle.
- Dimensions : L = 430 - D = 465 - H = 289 mm.

## • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.

## • PTRPILOT®

Driving software for DTR allowing the following operations :

- Configuration of the test type.
- Configuration of the setting mode «normal» or «fault».
- Selection of current and/or voltage ranges.
- Measure of the amplitude (RMS) : 0.1% of the range.
- Control of current and/or voltage injection and start of the timer when the configuration changes between «normal» and «fault» state. Timer stops automatically when receiving an information on «stop» terminals.
- Frequency measure (accuracy 0.01Hz  $\pm$  1 digit).
- Phase angle measure (accuracy 1°  $\pm$  1 digit).
- Delay measure up to 2000 sec (resolution 1ms).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Automatic measure of the tripping value (hold function).
- Serial output RS232.

## • External converter inputs

- 1 External current measure input : 0/20mAdc.
- 1 External voltage measure input : 0/10Vdc.

## • Contact relay outputs

- Contact relay output coupled to the injection.
- Contact relay NO/NC : 125Vmax - 1A.

## • Electronic generators

- Electronically controlled current and voltage.
- Protection against overload, led indicator and reset switch.
- Frequency : Fixed 50Hz - Adjustable from 40 to 65Hz by 0.01Hz steps.
- Phase angle : Adjustable from 0 to 360°.

## 3 Current generators (choose the range when ordering)

Models	Current	Voltage	Power
DTR133 - 12A5	12.5A	8V	100VA
DTR133 - 5A	5A	20V	100VA
DTR033 - 12A5	12.5A	4V	50VA
DTR033 - 5A	5A	10V	50VA

## 3 Voltage generators (choose the range when ordering)

Range	Time	I <sub>max</sub>	Power
0 to 150Vac	Permanent	0,33A	50VA

## • Connectivity

- Output voltage, current and timer security plugs :  $\varnothing$ 4mm.

## • Options

- Transportation Pelicase.
- **DTRX33-M** : Manuel adjustment by potentiometers and visualization display.
- Main power supply : 115Vac.
- Frequency : variable from 40 to 400 Hz by 0.1Hz steps.
- Auxiliary power supply : 24 / 48 / 127 / 250Vcc (15W).
- Other voltage or current ranges on request.

## • Divers

- This material is CEM certified according to EN50081-2 and EN50082-2.

# SECONDARY INJECTION TEST CASE

300V

50A

3U  
3I

## High accuracy electronic generator:

- PTR33/U : 3 Voltages up to 300Vac - 100VA
- PTR33/I : 3 Currents up to 50Aac - 150VA

## Two user modes available :

- **Manual Mode :**
  - Manual adjustment of the different injection values by push button and potentiometers.
  - Test configuration thanks to the MICROPILOT® menus.
- **Driving Mode:**
  - Driving mode thanks to the PTRPILOT software running under Windows XP/NT/Vista/7.

Picture for illustration purposes only.



PTR33U + PTR33I

## • Packaging

- 2 boxes - «Flight Case» .
- Dimensions : 2 x L = 400 - W = 295 - H = 400 mm.

## • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Wiring cord to connect PTR33/U.
- Protected by mini circuit-breaker.

## • Fixed auxiliary voltage supply

- 24 / 48 / 127 / 250 Vcc (15W). Selection by switch button.

## • MICROPILOT® (Usually implanted on current box)

Microcontroller controlled module with backlight LCD display, function keys, and navigation menus, allowing to execute the following operations :

- Configuration of the test type.
- Configuration of the setting mode «normal» or «fault».
- Selection of current and voltage ranges.
- Injection control of current and/or voltage.
- Display current, voltage and homopolar values.
- Measure of the amplitude (RMS) : 0.2% of the range.
- Control of current and/or voltage injection and start of the timer when the configuration changes between «normal» and «fault» state. Timer stops automatically when receiving an information on «stop» terminals.
- Frequency measure (accuracy 0.01Hz ± 1 digit).
- Phase angle measure (accuracy 1° ± 1 digit).
- Delay measure up to 2000 sec (resolution 1ms).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Automatic measure of the tripping value (hold function).
- Serial output RS232.

## • Connectivity

- Wiring cord to connect PTR33U and PTR33I.
- Output current lockable security plugs : ø6mm.
- Output voltage and timer security plugs : ø4mm.
- Lockable threaded rods suitable to current terminals.
- ø6 / ø4 adaptators for current terminals.

## • Electronic generators

- Electronically controlled current and voltage.
- Adjustment with potentiometers by 0.01A steps for current and 0.1V steps for voltage.
- Protection against overload, led indicator and reset switch.
- Frequency : Fixed 50Hz - Adjustable from 40 to 65Hz by 0.01Hz steps.
- Phase angle : Adjustable from 0 to 360° using «+» and «-» keys.
- Possibility to simulate a homopolar voltage phase opposed with U1 voltage without distort the RST triangle.

## 3 Voltage generators 100VA :

Range U	75V	150V	300V
I max.	1.33A	0.66A	0.33A
Time	Permanent	Permanent	Permanent

## 3 Current generators 150VA :

Range I	5A	12.5A	25A	50A
U max.	30V	12V	6V	3V
Time	10 min	10 min	5 min	1 min

Version PTR33I : 3 current ranges 5A/25A/50A (200VA).

Version PTR33IP : 3 current ranges 5A/12.5A/25A (200VA).

Version PTR33IN : 3 current ranges 12.5A/25A/50A (200VA).

## • Options

- Main power supply 115Vac.
- Frequency : 40 to 400 Hz by 0.1Hz steps.
- Auxiliary power supply : 24 / 48 / 127Vcc (15W) / 100Vca (15VA).
- Other voltage or current ranges on request.
- Rolling tray : PTR33U-PR, PTR33I-PR
- CTRWIN : Real time capture software of all results running on Windows XP/NT/Vista/7
- PTRPILOT : Driving software running on Windows XP/NT/Vista/7. Purposes both manual and driving modes.

## • Others

- This Material is CEM certified according to EN50081-2 and EN50082-2.

Guarantee one year parts and labor. All interventions are carried out exclusively in our factory.

Due to continuous research program, these characteristics can be modified.

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# SECONDARY INJECTION TEST CASE

300V

50A

3U  
3I

## High accuracy electronic generator :

- 3 Voltages up to 300Vac - 50VA
- 3 Current up to 50Aac - 200VA

## Two user modes available :

### • Manual Mode :

- Manual adjustment of the different injection values by push button and potentiometers.
- Test configuration thanks to the MICROPILOT® menus.

### • Driving Mode:

- Driving mode thanks to the PTRPILOT software running under Windows XP/NT/Vista/7.

Picture for illustration purposes only.



PTR 233

### • Packaging

- Box - «Flight Case».
- Dimensions : L = 535 - W = 450 - H = 460 mm.

### • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.

### • Fixed auxiliary voltage supply

- 24 / 48 / 127 / 250 Vcc (15W). Selection by switch button.

### • MICROPILOT®

Microcontroller controlled module with backlight LCD display, function keys, and navigation menus, allowing to execute the following operations :

- Configuration of the test type.
- Configuration of the setting mode «normal» or «fault».
- Choice of current and voltage ranges.
- Display current, voltage and homopolar values.
- Measure of the amplitude (RMS) : 0.2% of the range.
- Control of current and/or voltage injection and start of the timer when the configuration changes between «normal» and «fault» state. Timer stops automatically when receiving an information on «stop» terminals.
- Frequency measure (accuracy 0.01Hz  $\pm$  1 digit).
- Phase angle measure (accuracy 1°  $\pm$  1 digit).
- Delay measure up to 2000 sec (resolution 1ms).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Automatic measure of the tripping value (hold function).
- Serial output RS232.

### • Connectivity

- Output current lockable security plugs :  $\varnothing$ 6mm.
- Output voltage and timer security plugs :  $\varnothing$ 4mm.
- Lockable threaded rods suitable to current terminals.
- $\varnothing$ 6 /  $\varnothing$ 4 adaptators for current terminals.

### • Electronic generators

- Electronically controlled current and voltage.
- Adjustment with potentiometers by 0.01A steps for current and 0.1V steps for voltage.
- Protection against overload, led indicator and reset switch.
- Frequency : Fixed 50Hz - Adjustable from 40 to 65Hz by 0.01Hz steps.
- Phase angle : Adjustable from 0 to 360° using «+» and «-» keys.
- Possibility to simulate a homopolar voltage phase opposed with U1 voltage without distort the RST triangle.

### 3 Voltage generators 50VA :

Range U	75V	150V	300V
I max.	0.66A	0.33A	0.16A
Time	Permanent	Permanent	Permanent

### 3 Current generators 200VA :

Range I	5A	12.5A	25A	50A
U max.	40V	16V	8V	3V
Time	10 min	10 min	5 min	1 min

Version **PTR233** : 3 current ranges 5A/25A/50A (200VA).

Version **PTR233-P** : 3 current ranges 5A/12,5A/25A (200VA).

Version **PTR233-N** : 3 current ranges 12,5A/25A/50A (200VA).

### • Options

- Main power supply 115Vac.
- Frequency : 40 to 400 Hz by 0.1Hz steps.
- Auxiliary power supply : 24 / 48 / 127Vcc (15W) / 100Vca (15VA).
- Other voltage or current ranges on request.
- Rolling tray.
- **CTRWIN** : Real time capture software of all results running on Windows XP/NT/Vista/7.
- **PTRPILOT** : Driving software running on Windows XP/NT/Vista/7. Purposes both manual and driving modes.

### • Others

- This Material is CEM certified according to EN50081-2 and EN50082-2.

Guarantee one year parts and labor. All interventions are carried out exclusively in our factory.

Due to continuous research program, these characteristics can be modified.

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# SECONDARY INJECTION TEST CASE

300V

25A

3U  
3I

## High accuracy electronic generator :

- 3 Voltages up to 300Vac - 50VA
- 3 Current up to 25Aac - 100VA

## Two user modes available :

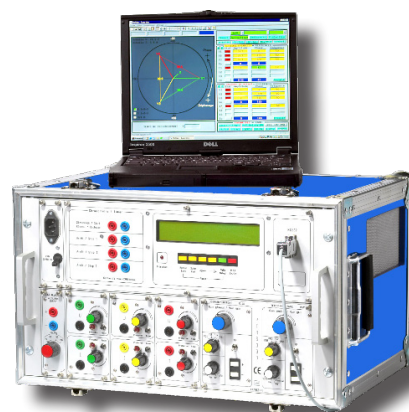
### • Manual Mode :

- Manual adjustment of the different injection values by push button and potentiometers.
- Test configuration thanks to the MICROPILOT® menus.

### • Driving Mode:

- Driving mode thanks to the PTRPILOT software running under Windows XP/NT/Vista/7.

Picture for illustration purposes only.



PTRS 133 / 033

## • Packaging

- Box - «Flight Case».
- Dimensions : L = 535 - W = 320 - H = 460 mm.

## • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.

## • Fixed auxiliary voltage supply

- 24 / 48 / 127 / 250 Vcc (15W). Selection by switch button.

## • MICROPILOT®

Microcontroller controlled module with backlight LCD display, function keys, and navigation menus, allowing to execute the following operations :

- Configuration of the test type.
- Configuration of the setting mode «normal» or «fault».
- Choice of current and voltage ranges.
- Display current, voltage and homopolar values.
- Measure of the amplitude (RMS) : 0.2% of the range.
- Control of current and/or voltage injection and start of the timer when the configuration changes between «normal» and «fault» state. Timer stops automatically when receiving an information on «stop» terminals.
- Frequency measure (accuracy 0.01Hz ± 1 digit).
- Phase angle measure (accuracy 1° ± 1 digit).
- Delay measure up to 2000 sec (resolution 1ms).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Automatic measure of the tripping value (hold function).
- Serial output RS232.

## • Connectivity

- Output current lockable security plugs : Ø6mm.
- Output voltage and timer security plugs : Ø4mm.
- Lockable threaded rods suitable to current terminals.
- Ø6 / Ø4 adaptators for current terminals.

## • Electronic generators

- Electronically controlled current and voltage.
- Adjustment with potentiometers by 0.01A steps for current and 0.1V steps for voltage.

Guarantee one year parts and labor. All interventions are carried out exclusively in our factory.

- Protection against overload, led indicator and reset switch.
- Frequency : Fixed 50Hz - Adjustable from 40 to 65Hz by 0.01Hz steps.
- Phase angle : Adjustable from 0 to 360° using «+» and «-» keys.
- Possibility to simulate a homopolar voltage phase opposed with U1 voltage without distort the RST triangle.

## 3 Voltage 50VA and Current 100VA generators :

Model	Voltage Ranges (I max.)	Current Ranges (U max.)
133V6A	150V (0.33A)	12.5A (8V)
133V6B	300V (0.16A)	12.5A (8V)
133V6C	150V (0.33A)	5A (20V)
133V6D	300V (0.16A)	25A (4V)
133V6E	150V (0.33A)	25A (4V)

Option : PTRS033 identical to the PTRS133 except current power to 50VA

## • Options

- Main power supply 115Vac.
- Frequency : 40 to 400 Hz by 0.1Hz steps.
- Auxiliary power supply : 24 / 48 / 127 Vcc (15W) 100Vca (15VA).
- Other voltage or current ranges on request.
- Rolling tray.
- CTRWIN : Real time capture software of all results running on Windows XP/NT/Vista/7
- PTRPILOT : Driving software running on Windows XP/NT/Vista/7. Purposes both manual and driving modes.

## • Others

- This Material is CEM certified according to EN50081-2 and EN50082-2.

Due to continuous research program, these characteristics can be modified.

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# SECONDARY INJECTION TEST CASE

300V

50A

2I  
3U+1I

## High accuracy electronic generator :

- 3 Voltages up to 300Vac - 50VA
- 1 + 2 Currents up to 50Aac - 200VA

## Two user modes available :

- **Manual Mode :**
  - Manual adjustment of the different injection values by push button and potentiometers.
  - Test configuration thanks to the MICROPILOT® menus.
- **Driving Mode:**
  - Driving mode thanks to the PTRPILOT software running under Windows XP/NT/Vista/7.



Picture for illustration purposes only.

PTRS231 + PTRS002E

## • Packaging

- 2 boxes - «Flight Case».
- Dimensions : 2 x L = 400 - W = 295 - H = 400 mm.

## • Main power supply

- 230Vac Single Phase + Earth - 50 / 60 Hz.
- Connection by Europa plug - Cord supplied.
- Wiring Cord to connect PTRS002E.
- Protected by mini circuit-breaker.

## • Fixed auxiliary voltage supply

- 24 / 48 / 127 / 250 Vcc (15W). Selection by switch button.

## • MICROPILOT®

Microcontroller controlled module with backlight LCD display, function keys, and navigation menus, allowing to execute the following operations :

- Configuration of the test type.
- Configuration of the setting mode «normal» or «fault».
- Choice of current and voltage ranges.
- Display current, voltage and homopolar values.
- Measure of the amplitude (RMS) : 0.2% of the range.
- Control of current and/or voltage injection and start of the timer when the configuration changes between «normal» and «fault» state. Timer stops automatically when receiving an information on «stop» terminals.
- Frequency measure (accuracy 0.01Hz ± 1 digit).
- Phase angle measure (accuracy 1° ± 1 digit).
- Delay measure up to 2000 sec (resolution 1ms).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Automatic measure of the tripping value (hold function).
- Serial output RS232.

## • Connectivity

- Link cable between PTRS231 and PTRS002E.
- Output current lockable security plugs : Ø6mm.
- Output voltage and timer security plugs : Ø4mm.
- Lockable threaded rods suitable to current terminals.
- Ø6 / Ø4 adaptators for current terminals.

## • Electronic generators

- Electronically controlled current and voltage.
- Adjustment with potentiometers by 0.01A steps for current and 0.1V steps for voltage.
- Protection against overload, led indicator and reset switch.
- Frequency : Fixed 50Hz - Adjustable from 40 to 65Hz by 0.01Hz steps.
- Phase angle : Adjustable from 0 to 360° using «+» and «-» keys.
- Possibility to simulate a homopolar voltage phase opposed with U1 voltage without distort the RST triangle.

## 3 Voltage generators de tension 50VA :

Range U	75V	150V	300V
I max.	0.66A	0.33A	0.16A
Time	Permanent	Permanent	Permanent

## 3 Current generators 200VA :

Range I	5A	12.5A	25A	50A
U max.	40V	16V	8V	4V
Time	10 min	10 min	5 min	1 min

Version PTRS231 : 3 current ranges 12.5A/25A/50A (200VA).

Version PTRS231P : 3 current ranges 5A/12.5A/25A (200VA).

## • Options

- Main power supply 115Vac.
- Frequency : 40 to 400 Hz by 0.1Hz steps.
- Auxiliary power supply : 24 / 48 / 127Vcc (15W) 100Vca (15VA).
- Other voltage or current ranges on request.
- Rolling tray.
- **CTRWIN** : Real time capture software of all results running on Windows XP/NT/Vista/7
- **PTRPILOT** : Driving software running on Windows XP/NT/Vista/7. Purposes both manual and driving modes.

## • Others

- This Material is CEM certified according to EN50081-2 and EN50082-2.

# SECONDARY INJECTION TEST CASE

300V

50A

3U  
1I

## High accuracy electronic generator :

- 3 Voltages up to 300Vac - 50VA
- 1 Current up to 50Aac - 200VA

## Two user modes available :

- **Manual Mode :**
  - Manual adjustment of the different injection values by push button and potentiometers.
  - Test configuration thanks to the MICROPILOT® menus.
- **Driving Mode:**
  - Driving mode thanks to the PTRPILOT software running under Windows XP/NT/Vista/7.



Picture for illustration purposes only.

PTRS 231

## • Packaging

- Box - «Flight Case».
- Dimensions : L = 400 - W = 295 - H = 400 mm.

## • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.

## • Fixed auxiliary voltage supply

- 24 / 48 / 127 / 250 Vcc (15W). Selection by switch button.

## • MICROPILOT®

Microcontroller controlled module with backlight LCD display, function keys, and navigation menus, allowing to execute the following operations :

- Configuration of the test type.
- Configuration of the setting mode «normal» or «fault».
- Choice of current and voltage ranges.
- Display current, voltage and homopolar values.
- Measure of the amplitude (RMS) : 0.2% of the range.
- Control of current and/or voltage injection and start of the timer when the configuration changes between «normal» and «fault» state. Timer stops automatically when receiving an information on «stop» terminals.
- Frequency measure (accuracy 0.01Hz ± 1 digit).
- Phase angle measure (accuracy 1° ± 1 digit).
- Delay measure up to 2000 sec (resolution 1ms).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Automatic measure of the tripping value (hold function).
- Serial output RS232.

## • Connectivity

- Output current lockable security plugs : Ø6mm.
- Output voltage and timer security plugs : Ø4mm.
- Lockable threaded rods suitable to current terminals.
- Ø6 / Ø4 adaptators for current terminals.

## • Electronic generators

- Electronically controlled current and voltage.
- Adjustment with potentiometers by 0.01A steps for current and 0.1V steps for voltage.
- Protection against overload, led indicator and reset switch.
- Frequency : Fixed 50Hz - Adjustable from 40 to 65Hz by 0.01Hz steps.
- Phase angle : Adjustable from 0 to 360° using «+» and «-» keys.
- Possibility to simulate a homopolar voltage phase opposed with U1 voltage without distort the RST triangle.

## 3 Voltage generators 50VA :

Range U	75V	150V	300V
I max.	0.66A	0.33A	0.16A
Time	Permanent	Permanent	Permanent

## 1 Current generator 200VA :

Range I	5A	12.5A	25A	50A
U max.	40V	16V	8V	4V
Time	10 min	10 min	5 min	1 min

Version PTRS231P : 3 current ranges 5A/12,5A/25A (200VA).

Version PTRS231 : 3 current ranges 12,5A/25A/50A (200VA).

## • Options

- Main power supply 115Vac.
- Frequency : 40 to 400 Hz by 0.1Hz steps.
- Auxiliary power supply : 24 / 48 / 127Vcc (15W) 100Vca (15VA).
- Other voltage or current ranges on request.
- Rolling tray.
- **CTRWIN** : Real time capture software of all results running on Windows XP/NT/Vista/7.
- **PTRPILOT** : Driving software running on Windows XP/NT/Vista/7. Purposes both manual and driving modes.

## • Others

- This Material is CEM certified according to EN50081-2 and EN50082-2.

# SECONDARY INJECTION TEST CASE

300V

200A  
max

3U  
1I

## High accuracy electronic generator :

- 3 Voltages up to 300Vac - 50VA

## 1 electrotechnic current generator :

- PTR531E-200A : 1 current up to 200Aac
- PTR531E-100A : 1 current up to 100Aac
- Power max : 500VA

## Manual mode :

- Manual adjustment of the different injection values by push button and potentiometers.
- Test configuration thanks to the MICROPILOT® menus.



Picture for illustration purposes only.

PTR 531E

## • Packaging

- Box - «Flight Case».
- Dimensions : L = 535 - W = 450 - H = 460 mm.

## • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.

## • Fixed auxiliary voltage supply

- 24 / 48 / 127 / 250 Vcc (15W). Selection by switch button.

## • MICROPILOT®

Microcontroller controlled module with backlight LCD display, function keys, and navigation menus, allowing to execute the following operations :

- Configuration of the test type.
- Configuration of the setting mode «normal» or «fault».
- Choice of current and voltage ranges.
- Display current, voltage and homopolar values.
- Measure of the amplitude (RMS) : 0.2% of the range.
- Control of current and/or voltage injection and start of the timer when the configuration changes between «normal» and «fault» state. Timer stops automatically when receiving an information on «stop» terminals.
- Frequency measure (accuracy 0.01Hz ± 1 digit).
- Phase angle measure (accuracy 1° ± 1 digit).
- Delay measure up to 2000 sec (resolution 1ms).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Automatic measure of the tripping value (hold function).
- Serial output RS232.

## • Connectivity

- Output current lockable security plugs : Ø6mm.
- Output voltage and timer security plugs : Ø4mm.
- Lockable threaded rods suitable to current terminals
- Ø6 / Ø4 adaptators for current terminals.
- Câbles 2 x 2.5m - 50mm².

## • 3 Electronic generators 50VA

- Electronically controlled current and voltage.
- Adjustment with potentiometers by 0.01A steps for current and 0.1V steps for voltage.
- Protection against overload, led indicator and reset switch.
- Frequency : Fixed 50Hz - Adjustable from 40 to 65Hz by 0.01Hz steps.
- Phase angle : Adjustable from 0 to 360° using «+» and «-» keys.
- Possibility to simulate a homopolar voltage phase opposed with U1 voltage without distort the RST triangle.

Range U	75V	150V	300V
I max.	0.66A	0.33A	0.16A
Time	Permanent	Permanent	Permanent

## • 1 Electrotechnic current generator 500VA

- Protected by mini circuit-breaker.
- Continuously adjustable using an auto-transformer.
- Use of an output transformer (500VA).
- Output ranges switching knob.

	Range I	U max	Time
PTR531E-100A	10A	2 or 50V	Permanent
	50A	5 or 10V	1 min
	100A	2.5 or 5V	1 min
PTR531E-200A	10A	2 or 50V	Permanent
	50A	5 or 10V	1 min
	200A	1.25 or 2.5V	1 min

## • Options

- Main power supply 115Vac.
- Frequency : 40 to 400 Hz by 0.1Hz steps.
- Auxiliary power supply : 24 / 48 / 127Vcc (15W) / 100Vca (15VA).
- Other voltage or current ranges on request.
- Rolling tray : PTR531E - PR.
- CTRWIN : Real time capture software of all results running on Windows XP/NT/Vista/7.

## • Other

- This material is CEM certified according to EN 50081-2 and EN 50082-2.

Due to continuous research program, these characteristics can be modified.

Guarantee one year parts and labor. All interventions are carried out exclusively in our factory.

01/12



# SECONDARY INJECTION TEST CASE

300V

50A

1U  
1I

## High accuracy electronic generator :

- 1 Voltage up to 300Vac - 50VA
- 1 Current up to 50Aac - 200VA

## Two user modes available :

- **Manual Mode :**
  - Manual adjustment of the different injection values by push button and potentiometers.
  - Test configuration thanks to the MICROPILOT® menus.
- **Driving Mode:**
  - Driving mode thanks to the PTRPILOT software running under Windows XP/NT/Vista/7.



Picture for illustration purposes only.

PTR211

## • Présentation

- Box - «Flight Case».
- Dimensions : L = 400 - W = 295 - H = 460 mm.

## • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.

## • Fixed auxiliary voltage supply

- 24 / 48 / 127 / 250 Vcc (15W). Selection by switch button.

## • MICROPILOT®

Microcontroller controlled module with backlight LCD display, function keys, and navigation menus, allowing to execute the following operations :

- Configuration of the test type.
- Configuration of the setting mode «normal» or «fault».
- Choice of current and voltage ranges.
- Display current, voltage values.
- Measure of the amplitude (RMS) : 0.2% of the range.
- Control of current and/or voltage injection and start of the timer when the configuration changes between «normal» and «fault» state. Timer stops automatically when receiving an information on «stop» terminals.
- Frequency measure (accuracy 0.01Hz  $\pm$  1 digit).
- Phase angle measure (accuracy 1°  $\pm$  1 digit).
- Delay measure up to 2000 sec (accuracy 1ms).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Automatic measure of the tripping value (hold function).
- Serial output RS232.

## • Connectivity

- Output current lockable security plugs :  $\varnothing$ 6mm.
- Output voltage and timer security plugs :  $\varnothing$ 4mm.
- Lockable threaded rods suitable to current terminals.
- $\varnothing$ 6 /  $\varnothing$ 4 adaptators for current terminals.

## • Electronic generators

- Electronically controlled current and voltage.
- Adjustment with potentiometers by 0.01A steps for current and 0.1V steps for voltage.
- Protection against overload, led indicator and reset switch.
- Frequency : Fixed 50Hz - Adjustable from 40 to 65Hz by 0.01Hz steps.
- Phase angle : Adjustable from 0 to 360° using «+» and «-» keys.

### 1 Voltage generator 50VA :

Range U	75V	150V	300V
I max.	0.66A	0.33A	0.16A
Time	Permanent	Permanent	Permanent

### 1 Current generator 200VA :

Range I	5A	12.5A	25A	50A
U max.	40V	16V	8V	4V
Time	10 min	10 min	5 min	1 min

Version **PTR211** : 3 current ranges **5A/25A/50A (200VA)**.

Version **PTR211-P** : 3 current ranges **5A/12,5A/25A (200VA)**.

Version **PTR211-N** : 3 current ranges **12,5A/25A/50A (200VA)**.

## • Options

- Main power supply 115Vac.
- Version **PTR011** : power of current module **50VA**.
- Frequency : 40 to 400 Hz by 0.1Hz steps.
- Auxiliary power supply : 24 / 48 / 127Vcc (15W) / 100Vca (15VA).
- Other voltage or current ranges on request.
- Rolling tray.
- **CTRWIN** : Real time capture software of all results running on Windows XP/NT/Vista/7
- **PTRPILOT** : Driving software running on Windows XP/NT/Vista/7. Purposes both manual and driving modes.

## • Others

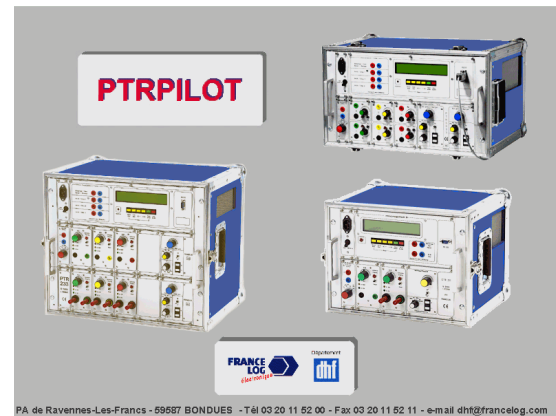
- This Material is CEM certified according to EN50081-2 and EN50082-2.

# DRIVING SOFTWARE

The software PTRPILOT allows, thanks to an evolutionary graphical interface to :

- Drive by computer the PTR and DTR injection test cases.
- Acquire the injected values and to visualize them in real time into a Fresnel diagram.
- Memorize values into an ACCESS database.
- Print the test reports.

If the PTR test case is used with the self-operating mode (control by keys or potentiometers), it is recommended to use the part of the software named CTRWIN (see the special user's manual).

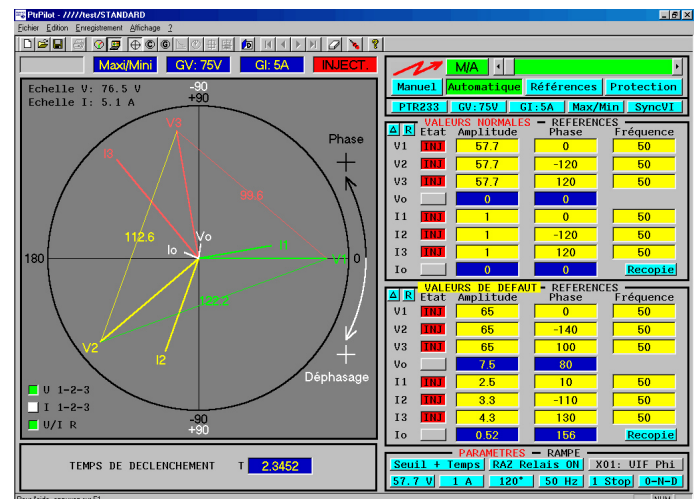


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PTRPILOT

If the programmable mode is used, it is possible to select :

- The test case type, the voltage and current ranges, the type of the tested relay.
- The manual function including :
  - the presetting and the injection of voltages and currents.
  - the capture in real time of the injected values.
- The automatic function including :
  - the presetting and the visualization of normal injection values.
  - the presetting and the visualization of default injection values.
  - the visualization in real time of the Fresnel diagram of injected values (simple voltage and current, compound and homopolar).
  - The automatic search and memorization of the threshold values.
  - the automatic search and memorization of the tripping time.
- The comparison of the results (threshold/time delay) and the theoretic reference values.
- The tests realized are saved in database ACCESS and personalized at request.
- At any time, it is possible to search, visualize, modify, delete the tests records in database.
- The test reports type standard, **C13100** or **GTE2666**, **PWH**,... can be printed.
- The database files (\*.MDB) are exportable in another application ACCESS or EXCEL.
- Compatible on **Windows XP/NT/Vista/7**.



PTRPILOT - MAX IHD SSL STANDARD											
File Edit Record View Help											
Informations				Measurements				Reference values			
Date: 04/19/2001 12:17:18 59 Selected test: Test name: MAX IHD SSL											
Test case type: PTR233 Function: Max/Mini Test type: X01: UIF Phl											
URST: IRST THRH: X TIME X Rel Res X Stops nb 1 Synch. SynVl Slope N-D											
dV(V) 0.1 dI(A) 0.05 dF(Hz) 0.01 dPhi(°) 1 dt(S) 1.9 NVD(S) 3 DT(S) 100.00											
U range (V) 75.00 THRESH. NORMAL DEFAULT I range (A) 5.00 THRESH. NORMAL DEFAULT											
Phase 1 voltage (V)			57.6	57.7	57.7	Phase 1 current (A)			2.01	2.00	2.00
Phase 2 voltage (V)			57.8	57.7	57.7	Phase 2 current (A)			2.01	2.00	2.00
Phase 3 voltage (V)			20.0	20.0	20.0	Phase 3 current (A)			2.21	2.00	2.80
U1/2 voltage (V)			99.9	99.9	99.9	I1/2 current (A)			3.50	3.46	3.46
U2/3 voltage (V)			70.0	69.9	69.9	I2/3 current (A)			3.66	3.46	4.18
U3/1 voltage (V)			69.8	69.9	69.9	I3/1 current (A)			3.64	3.46	4.18
V1/V1 phaseshift (°)			+000	+000	+000	I1/V1 phaseshift (°)			+136	+135	+135
V2/V1 phaseshift (°)			+120	+120	+120	I2/V2 phaseshift (°)			+137	+135	+135
V3/V1 phaseshift (°)			-120	-120	-120	I3/V3 phaseshift (°)			+137	+135	+135
V1 phase (°)			+000	+000	+000	I1 phase (°)			-136	-135	-135
V2 phase (°)			-120	-120	-120	I2 phase (°)			+103	+105	+105
V3 phase (°)			+120	+120	+120	I3 phase (°)			-017	-015	-015
V1 frequency (Hz)			50.00	50.00	50.00	I frequency (Hz)			50.00	50.00	50.00
V2/3 frequency (Hz)			50.00	50.00	50.00	SW (W)			7.050	0.000	21.650
Vo voltage (V)			12.6	12.6	12.6	Io current (A)			0.08	0.00	0.27
PVo phase (°)			-060	-060	-060	Plo phase (°)			-021	+000	
T1 0.1970 T2 0.0000 T3 0.0000 T4 0.0000 T5 0.0000 T6 0.0000 T7 0.0000											

Guarantee one year parts and labor. All intervention are carried out exclusively in our factory.

Due to continuous research program, these characteristics can be modified.

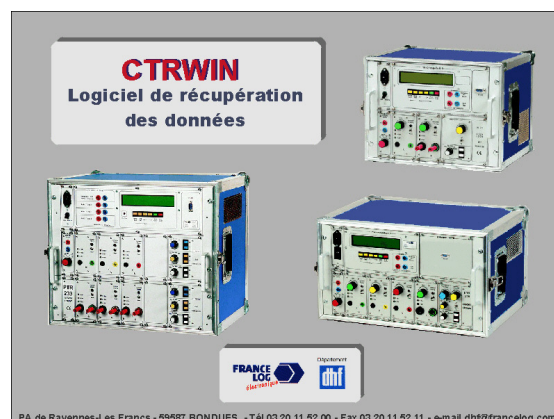
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# CAPTURE SOFTWARE

The software CTRWIN allows, thanks to an evolutionary graphical interface to :

- Acquire the injected values and to visualize them in real time into a Fresnel diagram.
- Memorize values into an ACCESS database.
- Print the test reports.

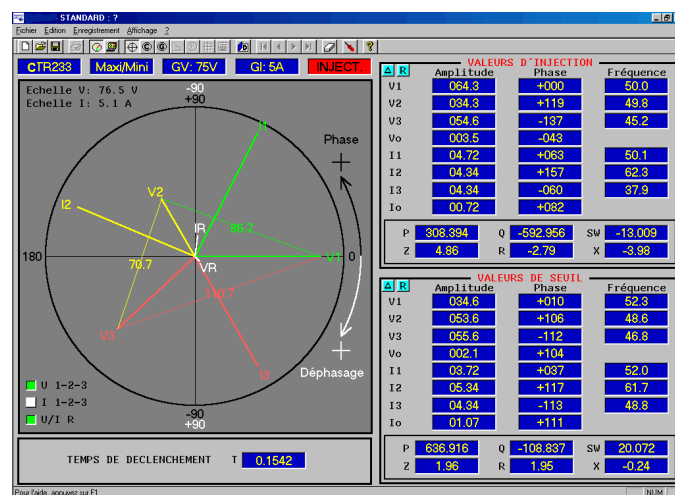
In addition to the CTRWIN software, the PTRPILOT can be used to allow you to command with a computer your DTR and PTR injection test cases (see the special user's manual).



# CTRWIN

If the test cases are used with the [self-operating mode](#) (control by keys or potentiometers), the CTRWIN software allows, in real time to :

- To capture the type of case tested, the current and voltage.
- To visualize in real time the Fresnel diagram of injected values (simple voltage and current, compound and homopolar).
- Visualize and search threshold values.
- Visualize and search the tripping time of the protections.
- The comparison of the results (threshold/time delay) and the theoretic reference values.



- The tests realized are saved in database ACCESS and personalized at request.
- At any time, it is possible to search, visualize, modify, delete the tests records in database.
- The test reports type standard, **C13100 or GTE2666, PWH,...** can be printed.
- The database files (\*.MDB) are exportable in another application ACCESS or EXCEL.
- Compatible on **Windows XP/NT/Vista/7.**

**...//MAX IHD SSL/STANDARD**

Fichier Edition Engagement Affichage ?

Coordonnées Observations Mesures Valeurs de références Protection Historique

Date 19/04/2001 12:17:18 59 Essai sélectionné Nom de l'essai MAX IHD SSL

Type de mallette	GTR233	Fonction	Max/Mini	Type d'essai	X01: UIF Phi
URST	IRST	SEUIL	TEMPS	RAZ REF	Nbre stops 1 Synch.
dV(N)	dI(A)	0.05	dF(Hz)	0.01	dPhi(°) 1 1.9
					DVN(S) 3 TD(S) 100.00

Game U (V)	75.00	SEUIL	NORMAL	DEFAULT	Game I (A)	5.00	SEUIL	NORMAL	DEFAULT
Tension Phase 1 (V)	57.6	57.7	57.7		Courant Phase 1 (A)	2.01	2.00	2.00	
Tension Phase 2 (V)	57.8	57.7	57.7		Courant Phase 2 (A)	2.01	2.00	2.00	
Tension Phase 3 (V)	20.0	20.0	20.0		Courant Phase 3 (A)	2.21	2.00	2.80	
Tension U1/2 (V)	99.9	99.9	99.9		Courant I1/2 (A)	3.50	3.46	3.46	
Tension U2/3 (V)	70.0	69.9	69.9		Courant I2/3 (A)	3.66	3.46	4.18	
Tension U3/1 (V)	69.8	69.9	69.9		Courant I3/1 (A)	3.64	3.46	4.18	
Déphasage V1/V1 (*)	+000	+000	+000		Déphasage I1/V1 (*)	+136	+135	+135	
Déphasage V2/V1 (*)	+120	+120	+120		Déphasage I2/V2 (*)	+137	+135	+135	
Déphasage V3/V1 (*)	-120	-120	-120		Déphasage I3/V3 (*)	+137	+135	+135	
Phase V1 (*)	+000	+000	+000		Phase I1 (*)	-136	-135	-135	
Phase V2 (*)	-120	-120	-120		Phase I2 (*)	+103	+105	+105	
Phase V3 (*)	+120	+120	+120		Phase I3 (*)	-017	-015	-015	
Fréquence V1 (Hz)	50.00	50.00	50.00		Fréquence I (Hz)	50.00	50.00	50.00	
Fréquence V2/3 (Hz)	50.00	50.00	50.00		SW (V)	7.050	0.000	21.650	
Tension Vo (V)	12.6	12.6	12.6		Courant Io (A)	0.08	0.00	0.27	
Phase PVo (*)	-060	-060	-060		Phase PIo (*)	-021	+000		

T1	0.1970	T2	0.0000	T3	0.0000	T4	0.0000	T5	0.0000	T6	0.0000	T7	0.0000
----	--------	----	--------	----	--------	----	--------	----	--------	----	--------	----	--------

Bienvenue dans le monde des tests

# PRIMARY OR SECONDARY INJECTION TEST CASE

300Vac  
350Vdc

200Aac

1Uac  
1Iac  
1Vdc

## Multi-range Electrotechnic generator :

### • 1 Electrotechnic current generator:

- 1 Alternative current up to 200Aac : GCTM200.
- 1 Alternative current up to 100Aac : GCTM100.
- 1 Alternative voltage up to 250Vac.
- 1 Rectified and filtered voltage up to 350Vdc.

### or • 1 Electronic voltage generator :

- 1 Alternative voltage up to 300Vac.

## This system allows you to test:

- Minimum or maximum current or voltage relays.
- Current or voltage transformers.
- Delayed, electrotechnic and static relays.
- Power Relays.
- Statimax relays without auxiliary supply.
- Digital relays.

Picture for illustration purposes only.



GCTM 100 / 200

## • Packaging

- Box - «Flight Case».
- Dimensions : L = 360 - W = 280 - H = 300 mm.

## • Main power supply

- 230 Vac Single Phase + Earth - 50/60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.

## • MICROPILOT®

Microcontroller controlled module with backlight LCD display and function keys allowing to execute the following operations :

- Configuration of the test type (level setting, time delay).
- Configuration of the setting mode «Maximum» or «Minimum».
- Measure of the tripping value (hold function).
- Measure of the amplitude (RMS) : 0.5% of the range.
- Delay measure up to 2000 sec (resolution 1ms).
- Software able to realize start, start/stop and stop functions thanks to a push button on the appliance or using an external information (contact, or voltage from 24 up to 240Vdc).
- Frequency measure (accuracy 0.01Hz  $\pm$  1 digit).
- Phase angle measure (accuracy 1°  $\pm$  1 digit).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Serial output RS232.
- Contact relay output NO/NC : 250Vac - 2Amax.
- Measure input of external current : 5Aac max.
- Measure input of external voltage : 300Vac max.

## • Connectivity

- Output current lockable security plugs :  $\varnothing$ 6mm.
- Output voltage and timer security plugs :  $\varnothing$ 4mm.
- Lockable threaded rods suitable to current terminals.
- $\varnothing$ 6 /  $\varnothing$ 4 adaptators for current terminals.
- GCTM100 : Cables 2 x 2.5m - 25mm<sup>2</sup>.
- GCTM200 : Cables 2 x 2.5m - 50mm<sup>2</sup>.

## • Electrotechnic voltage or current generator

- Single phased electrotechnic generator.
- Protected by mini circuit-breaker.
- Continuously adjustable using an auto-transformer.
- Use of an output transformer (500VA).
- 4 Ranges for GCTM200 : 2A/10A/50A/200A.
- 4 Ranges for GCTM100 : 2A/10A/50A/100A.

Outputs	Ranges	Time	Umax (Pmax)
• Current AC	0 to 2Aac	10 minutes	250V (500VA)
	0 to 10Aac	10 minutes	50V (500VA)
	0 to 50Aac	1 minute	10V (500VA)
GCTM100	0 to 100Aac	1 minute	5V (500VA)
GCTM200	0 to 200Aac	1 minute	2.5V (500VA)
• Voltage AC	0 to 250Vac	Permanent	2A (500VA)
• Voltage DC	0 to 350Vdc	10 minutes	1.5A (500W)

## • Electronic voltage generator

- Electronically controlled voltage.
- Adjustment using potentiometers by 0.1V steps.
- Protection against overload, led indicator and reset switch.
- Frequency : Adjustable from 40 to 65Hz by 0.01Hz steps.
- Phase : Adjustable from 0 to 360° using «+» and «-» keys.

Range U	Time	I max	Power
0 to 75Vac	Permanent	0.66A	50VA
0 to 150Vac	Permanent	0.33A	50VA
0 to 300Vac	Permanent	0.16A	50VA

## • Options

- «Flight Case» with cord storage space.
- CTRWIN : Real time capture software of all results running on Windows XP/NT/Vista/7.

## • Others

- Material certified according to EN50081-2 et EN50082-2 - EN61010-1.

Guarantee one year parts and labor. All interventions are carried out exclusively in our factory.

Due to continuous research program, these characteristics can be modified.

01/12



# PRIMARY OR SECONDARY INJECTION TEST CASE

250V

50A  
100A  
200A

1U  
or  
1I

## Multi-range Electrotechnic generator :

- 1 Electrotechnic current according to models:
  - GCTS50 : up to 50 Aac.
  - GCTS100 : up to 100 Aac.
  - GCTS200 : up to 200 Aac.
- 1 Electrotechnic voltage up to 250Vac.
- Power 500VA max.

Easy to use, this compact test case has been developed for quick maintenance on sites.

Moreover, this generator offers both an optimal current adjustment thanks to the choice of power range, and a great accuracy.

Picture for illustration purposes only.



GCTS 50 / 100 / 200

## • This system allows you to test:

- Minimum or maximum current or voltage relays.
- Current or voltage transformers.
- Delayed, electrotechnic and static relays.
- Power Relays.
- Statimax relays without auxiliary supply.
- Digital relays - Great adjustment accuracy.

## • Packaging

- Box - «Flight Case».
- Dimensions : L = 260 - W = 240 - H = 300 mm.

## • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.

## • MICROPILOT®

Microcontroller controlled module with backlight LCD display and function keys allowing to execute the following operations :

- Configuration of the test type (level setting, time delay).
- Configuration of the setting mode «Maximum» or «Minimum».
- Automatic measure of the tripping value (hold function).
- Measure of the amplitude (RMS) : 0.5% of the range.
- Delay measure up to 2000 sec (resolution 1ms).
- Software able to realize start, start/stop and stop functions thanks to a push button on the appliance or using an external information (contact, or voltage from 24 up to 240Vdc).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Serial output RS232.

## • Electrotechnic voltage or current generator

- Selection of the output ranges using a switch button.
- Protected by mini circuit-breaker.
- Continuously adjustable using an auto-transformer.
- Output voltage : 0 to 250Vac (2Amax).

Models	Ranges	Time	Power
• GCTS50	0 to 2A	Permanent	10 or 250V
	0 to 10A	Permanent	2 or 50V
	0 to 20A	Permanent	0.2V
	0 to 50A	1 minute	8V
• GCTS100	0 to 2A	Permanent	10 or 250V
	0 to 50A	30 secondes	5 or 10V
	0 to 100A	30 secondes	2 or 5V
• GCTS200	0 to 2A	Permanent	10 or 250V
	0 to 50A	30 secondes	5 or 10V
	0 to 200A	30 secondes	1.25 or 2.5V

## • Connectivity

- Output current lockable security plugs : ø6mm.
- Lockable threaded rods suitable to current terminals.
- ø6 / ø4 adaptators for current terminals.
- GCTS100 : Cables 2 x 2.5m - 25mm<sup>2</sup>.
- GCTS200 : Cables 2 x 2.5m - 50mm<sup>2</sup>.

## • Options

- Other voltage or current ranges on request.
- «Flight Case» with cord storage space.
- CTRWIN : Real time capture software of all results running on Windows XP/NT/Vista/7.

# PRIMARY OR SECONDARY INJECTION TEST CASE

300V

200A

1U

1I

## 2 Multi-range Electrotechnic generators :

- 1 Voltage up to 300Vac.
- 1 Current up to 200Aac.

### This system allows you to test :

- Minimum or maximum current or voltage relays.
- Current or voltage transformers.
- Delayed, electrotechnic and static relays.
- Power relays.
- Small circuit breakers.
- Statimax relays without auxiliary supply.
- **Digital relays - High adjustment accuracy.**

Picture for illustration purposes only.



GCTD 50 / 100 / 200

### • Packaging

- Box - «Flight Case».
- Dimensions : L = 430 - W = 270 - H = 300 mm.

### • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.

### • MICROPILOT®

- Microcontroller controlled module with backlight LCD display and function keys allowing to execute the following operations :
- Configuration of the test type (level setting, time delay).
  - Configuration of the setting mode «Maximum» or «Minimum».
  - Automatic measure of the tripping value (hold function).
  - Measure of the amplitude (RMS) : 0.5% of the range.
  - Delay measure up to 2000 sec (resolution 1ms).
  - Software able to realize start, start/stop and stop functions thanks to a push button on the appliance or using an external information (contact, or voltage from 24 up to 240Vdc).
  - Measure of recloser delays.
  - Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
  - Serial output RS232.

### • Connectivity

- Output current lockable security plugs : ø6mm.
- Output voltage, current and timer security plugs : ø4mm.
- Lockable threaded rods suitable to current terminals.
- ø6 / ø4 adaptators for current terminals.
- GCTD100 : Cables 2 x 2.5m - 25mm<sup>2</sup>.
- GCTD200 Cables 2 x 2.5m - 25mm<sup>2</sup> (GCTD100) 50mm<sup>2</sup>..

### • Options

- Other voltage or current ranges on request.
- «Flight Case» with cord storage space.
- **CTRWIN** : Real time capture software of all results running on Windows XP/NT/Vista/7.

### • Electrotechnic current generator

- Selection of the output range.
- Protected by mini circuit-breaker.
- Continuously adjustable using auto-transformer.

Models	Ranges	Time	Power
• GCTD50	0 to 2A	Permanent	0.3 or 0.6V
	0 to 10A	30 sec	1 or 2V
	0 to 50A	30 sec	4 or 10V
• GCTD100	0 to 10A	Permanent	8 or 20V
	0 to 50A	30 sec	4 or 10V
	0 to 100A	30 sec	2 or 5V
• GCTD200	0 to 5A	Permanent	20 or 40V
	0 to 50A	30 sec	4 or 10V
	0 to 200A	30 sec	1.25 or 2.5V

### • Electrotechnic voltage generator

- Selection of the output range.
- Protected by mini circuit-breaker.
- Continuously adjustable using auto-transformer.

Output	Ranges	Time	Power
• Voltage AC	0 to 75V	Permanent	1.4A
	0 to 150V	Permanent	0.7A
	0 to 300V	Permanent	0.35A

Guarantee one year parts and labor. All interventions are carried out exclusively in our factory.

Due to continuous research program, these characteristics can be modified.

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# SECONDARY OR PRIMARY INJECTION TEST CASE

1300A

2.5A  
25A

1U  
or  
1I

## Multirange electrotechnic generator :

Includes one master case GCTS1300M and one transformer case GCTS1300T :

- GCTS1300M :
  - 1 Current up to 25A (625A)
  - 1 Current up to (625VA)
  - 1 Voltage up to 250Vac (625VA)
- GCTS1300T :
  - 1 Current up to 1300A max
  - 1 Voltage up to 6Vac (650A max)

Simple Easy to use, this compact test case allows, thanks to an optimal current adjustment, to test statimax relays, bushings or digital relays.

Picture for illustration purposes only.



GCTS 1300MT

## • Packaging

- One master case GCTS1300M (405 x 290 x 300mm) and one transformer case CTS1300T (360 x 290 x 370mm).
- Box : «Flight Case» with cord storage place.
- Weight : < 25Kgs.
- One case GCTS1300M for the low power generation (625VA) and the driving of the the transformer case GCTS1300T.
- One case GCTS1300T linked to the GCTS1300M for the generation of the high currents up to 1300A.

## • Main power supply

- GCTS1300M : 230 Vac Single Phase + Earth - 50/60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit breaker.
- GCTS1300T : Power supplied by the case GCTS1300M.

## • MICROPILOT

Microcontroller controlled module with backlight LCD display, function keys, and navigation menus, allowing to execute the following operations :

- Selection of the test type (level setting, time delay).
- Command the current or voltage injection
- Selection of the protection type (**Maxi, Mini, Recloser, Default**).
- **Preprogrammed time injection function** by steps of 10ms.
- Automatic measure of the tripping value (hold function).
- Measure of the current and voltage amplitude (RMS) : 0.5% of the range.
- Delay measure up to 2000 sec (resolution 1ms).
- Software allowing to realize start, start/stop and stop functions thanks to a push button on the appliance or using an external information (contact, or voltage from 12 up to 250Vdc).

## • Connectivity

- Copper bars for high current output.
- Security plugs Ø4mm for 250Vac voltage output, 2A5 and 25A current output and timer.
- Output cables for plugs : 2 x 2.5m-25mm<sup>2</sup>.
- Output cables for copper bars : 2 x 3m-95mm<sup>2</sup>.
- Link cable between the injection cases : 2 x 2m-3x2.5mm<sup>2</sup>.

## • Electrotechnic generator

- Selection of the output ranges 2A5 and 25A by switching a knob for an optimal adjustment to test **digital relays**.
- Protected by mini circuit-breaker.
- Continuously adjustable by variable transformer.

### - Test case GCTS1300M alone :

Voltage	Current	Time
0 to 250Vac	0 to 2A5	Permanent in U
0 to 25Vac	0 to 25A	Permanent in U

### - Test cases GCTS1300M + GCTS1300T :

Voltage	Current	Time
0 to 6Vac	0 to 250A	10 minutes
	0 to 500A	5 minutes
	0 to 600A	1 minute
	0 to 750A	90 secondes
	0 to 1300A	20 secondes

## • Options

- Other current and voltage ranges on request.
- «Flight case» with cord storage place.
- **CTRWIN** : real time capture software of all results running on windows XP/NT/Vista/7.

# PRIMARY INJECTION TEST CASE

3V

500A

1I

## Electrotechnic Current Generator :

- 1 Current up to 500Aac.
- Power up to 1500VA.
- 3 Ranges : 500A / 250A / 20A.

Easy to use and powerful, this test case has been developed for quick maintenance on sites.

### This system allows you to test in single-phased mode:

- Minimum or maximum current or voltage relays.
- Current or voltage transformers.
- Matching range circuit breakers.

Picture for illustration purposes only.



MS 1500

### • Packaging

- Box - «Flight Case».
- Dimensions : L = 610 - D = 300 - H = 360 mm.

### • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.

### • MICROPILOT®

Microcontroller controlled module with backlight LCD display and function keys allowing to execute the following operations :

- Configuration of the test type (level setting, time delay).
- Configuration of the setting mode «Maximum» or «Minimum».
- Automatic measure of the tripping value (hold function).
- Measure of the amplitude (RMS) : 0.5% of the range.
- Delay measure up to 2000 sec (resolution 1ms).
- Software able to realize start, start/stop and stop functions thanks to a push button on the appliance or using an external information (contact, or voltage from 24 up to 240Vdc).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Serial output RS232.

### • Connectivity

- Output lockable security plugs.
- Output for 20A current output and timer : security plugs :  $\varnothing 4$ mm.
- Power cables provided : 2 x 5m - 50mm<sup>2</sup>.

### • Electrotechnic current generator

- Single phased electrotechnic generator.
- Protected by mini circuit-breaker.
- Continuously adjustable using auto-transformer.

Ranges	Time	Cables	Umax
0 to 500A	30 secondes	10m x 50mm <sup>2</sup>	3V
0 to 250A	30 minutes	10m x 50mm <sup>2</sup>	1.5V
0 to 20A	2 minutes	1 x 6mm <sup>2</sup>	2V

### • Options

- Other power or current ranges on request.
- Rolling tray.
- **CTRWIN** : Real time capture software of all results running on Windows XP/NT/Vista/7.



# PRIMARY INJECTION TEST CASE

6V

650A  
1200A  
2000A

1I

## Electrotechnic Current Generator :

- 1 Current up to 2000Aac.
- Power up to 4000VA.

Easy to use and powerful, this test case has been developed for quick maintenance to primary of auto-transformers.

This generator offers an optimum volume / power ratio. Moreover, the MS 4000 proposes highly accurate current measures.

### This system allows you to test in single-phased mode:

- Minimum or maximum current or voltage relays.
- Current or voltage transformers.
- Matching range circuit breakers.

Picture for illustration purposes only.



MS 4000 / MS 3000

### •Packaging

- Box - «Flight Case».
- Dimensions : L = 540 - D = 270 - H = 315 mm.
- Rolling tray.
- Weight : 39 Kgs without accessories.

### • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.

### • MICROPILOT®

Microcontroller controlled module with backlight LCD display and function keys allowing to execute the following operations :

- Configuration of the test type (level setting, time delay).
- Configuration of the setting mode «Maximum» or «Minimum».
- Automatic measure of the tripping value (hold function).
- Measure of the amplitude (RMS) : 0.5% of the range.
- Delay measure up to 2000 sec (resolution 1ms).
- Software able to realize start, start/stop and stop functions thanks to a push button on the appliance or using an external information (contact, or voltage from 24 up to 240Vdc).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Serial output RS232.

### •Connectivity

- Output on cooper bars.
- Output for 20A current output and timer : security plugs ø4mm.
- Provided power cables :
  - 1 x 5m - 150mm<sup>2</sup>.
  - 2 x 2.5m - 150mm<sup>2</sup>.

### • Electrotechnic current generator

- Single phased electrotechnic generator.
- Protected by mini circuit-breaker.
- Continuously adjustable using auto-transformer.

Models	Rasnges	Time	Umax
• MS4000	0 to 650A	15 minutes	6V
	0 to 1200A	1 minute	3.3V
	0 to 2000A	5 secondes	2V
	0 to 20A	15 minutes	5V
• MS3000	0 to 650A	15 minutes	4.5V
	0 to 1200A	1 minute	2.5V
	0 to 2000A	5 secondes	1V
	0 to 20A	15 minutes	4V

### •Options

- External measure input : 5A max.
- Other power or current ranges on request.
- Flat bar connector.
- **CTRWIN** : Real time capture software of all results running on Windows XP/NT/Vista/7.

# PRIMARY INJECTION TEST CASE

5V

3000A

1I

## Electrotechnic Current Generator :

- 1 Current up to 3000Aac.
- 1 Power 7500VA or 15000VA.
- 3 Current ranges.

This test case, the most powerful of our range, has been developed for quick maintenance to primary of transformers.

- This system allows you to test :
  - Minimum ou maximum current relays.
  - Current transformers, bushing.
  - Matching range circuit-breakers.

Picture for illustration purposes only.



MS 7500 / 15000

### • Packaging of Control Case

- Box - «Flight Case».
- Wheels equipped .
- Dimensions : L = 510 - D = 430 - H = 560 mm.

### • Packaging of Power Case

- 1 Power Box - «Flight Case» - MS 7500.
- 2 Power Boxes - «Flight Case» - MS 15000.
- Wheels equipped.
- Wiring cord to connect the Control Case.
- Dimensions : L = 370 - W = 400 - H = 620mm.

### • Main power supply

- **MS7500 / 15000** : 230 Vac Single Phase + Earth - 50 /60 Hz.
- **MS7500B / 1500B** : 380 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cords supplied.
- Protected by mini circuit-breaker.

### • MICROPILOT®

Microcontroller controlled module with backlight LCD display and function keys allowing to execute the following operations :

- Configuration of the test type (level setting, time delay).
- Configuration of the setting mode «Maximum» or «Minimum».
- Automatic measure of the tripping value (hold function).
- Measure of the amplitude (RMS) : 0.5% of the range.
- Delay measure up to 2000 sec (resolution 1ms).
- Software able to realize start, start/stop and stop functions thanks to a push button on the appliance or using an external information (contact, or voltage from 24 up to 240Vdc).
- Measure of recloser delays.
- Recognition of the state of the tripping information (contact or voltage 24 to 240Vdc).
- Serial output RS232.

### • Connectivity

- Output on cooper bars with coupling bars.
- Timer : security plugs ø4mm.
- Provided power cables : L = 4 x 5m - 185mm<sup>2</sup>.

### • Electrotechnic current generator

- Selection of current and voltage output by coupling the cooper bars.
- Protected by mini circuit-breaker.
- Continuously adjustable using auto-tranformer.

#### MS 7500 :

Ranges	Cables	Time	Umax
0 to 3000A	5m - 4 x 185mm <sup>2</sup>	20 secondes	2.5V
0 to 1500A	10m - 1 x 185mm <sup>2</sup>	20 secondes	5V
0 to 1500A	10m - 2 x 185mm <sup>2</sup>	3 minutes	2.5V

#### MS 15000 :

Range	Cables	Time	Umax
0 to 3000A	10m - 2 x 185mm <sup>2</sup>	5 secondes	5V
0 to 1500A	10m - 2 x 185mm <sup>2</sup>	20 secondes	7.5V
0 to 1500A	20m - 1 x 185mm <sup>2</sup>	10 secondes	10V

### • Options

- Other power or current ranges on request.
- **CTRWIN** : Real time capture software of all results running on Windows XP/NT/Vista/7.

# BATTERY DISCHARGER

230Vdc

300Adc

25kW

## Battery discharger :

- Discharge Power up to 25400 W.
- Discharge Current up to 300 Adc.

## Ultra compact : 26 kgs.

Battery maintenance operations requires to operate discharge on batteries. It is helpful to dispose of an equipment able to control the discharge and also to the preprogrammed current.

Constant current discharge controled thanks to a microcontroller.

Picture for illustration purposes only.



MDBS

## • Packaging

- Metallic Case : L = 570 - W = 270 - H = 570 mm.
- Wheels.
- Weight : 26 Kgs.

## • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Power consumption : 150W.
- Protected by fuse.

## • Control unit

Microcontroller controlled module with backlight LCD display and function keys allowing to execute the following operations :

- Polarity detection of the plugged battery.
- Voltage detection of the plugged battery.
- Adjustment of the end-discharge voltage by  $\pm 0.1V$  steps.
- Adjustment of the discharge current by 1A steps.
- Adjustment of the discharge time from 1 minute to 10 hours.
- Commands the start and the stop of the discharge.
- Measures the current and the voltage (accuracy 1%).
- Elapsed time counter.
- Total capacity calculator.
- Serial output RS232.

## • Protection

- Protection against electrical and thermal overloads.
- Protection against miswiring.
- End-discharge voltage battery control.

## • Connectivity

- Lockable battery plugs  $\varnothing 6mm$ .
- Cables 2 x 2m - 10mm<sup>2</sup> to 50mm<sup>2</sup> according to models.
- Battery aligator clips provided.

## • Current controller unit

- Depending of requirements, it can be necessary to add, to the master discharger **MDBS**, an auxiliary load named **MCA**. (our picture).
- Electronic system allowing to maintain the discharge current.

Models	Voltage	I max	Products
MDBS7200	12 to 96Vdc	150A	MDBS
MDBS11500	12 to 140Vdc	100A	MDBS
	140 to 230Vdc	50A	MDBS
MDBS14250	12 to 190Vdc	75A	MDBS
MDBS14400	12 to 96Vdc	300A	MDBS+MCA
MDBS25400	12 to 140Vdc	200A	MDBS+MCA
	140 to 230Vdc	100A	MDBS+MCA

## • Options

- Other current or voltage ranges on request.
- **MDBSWIN** : Driving and capture software of measurements and discharge curves visualization.

Guarantee one year parts and labor. All interventions are carried out exclusively in our factory.

Due to continuous research program, these characteristics can be modified.

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# BATTERY DISCHARGER

415Vdc

60A dc

12kW

## Battery discharger :

- Discharge Power up to 12000W.
- Discharge Current up to 60A.

## Multi-Voltage up to 415Vdc

Battery maintenance operations requires to operate discharge on batteries. It is helpful to dispose of an equipment able to control the discharge and also to the pre-programmed current.

Constant current discharge controled thanks to a micro-controller.

Picture for illustration purposes only.



MDB 12000C

## • Packaging

- Metallic Case : L = 1040 - W = 700 - H = 900 mm.
- Wheels - Carrying handle - Lifting rings.
- Weight : 95 Kgs.

## • Main power supply

- 230 Vac Single Phase + Earth - 50/60 Hz.
- Connection by Europa plug - Cord supplied.

## • Remote control

LCD equipped interface, function keys and navigation menus allowing to execute the following operations :

- Detection of the number of benches linked together in network (up to 4 benches).
- Polarity detection of the battery plugged.
- Voltage detection of the battery plugged.
- Adjustment of the end-discharge voltage (65 à 100%).
- Adjustment of the discharge current by  $\pm 1A$  steps.
- Adjustment of the discharge time from 1 minute to 10 hours.
- Activates start and stop of the discharge.
- Measures the current and the voltage.
- Elapsed time counter.
- Total capacity calculator.
- Serial output RS232.

## • Protection

- On/Off switch button.
- Emergency push button.
- Protection against electrical and thermal overloads.
- Protection against miswiring.
- End-discharge voltage control.

## • Connectivity

- Lockable battery plugs  $\varnothing 6mm$ .
- Sub-D9 connector for remote control.
- Benches chained by lockable DIN connectors.
- Cables 2 x 2m - 10mm<sup>2</sup>.

## • Control unit

- Electronic system allowing the control of the discharge current from 1 to 60A for voltages from 24 to 230Vdc and 1 to 30A for the 415Vdc version.
- Maximum utilisation power : 12000W per battery discharger.
- Current control accuracy :  $1A \pm 1$  digit.
- Possibility to set several benches in network (4 benches max).

Voltage	Current Max
from 48 to 230Vdc	60 A
from 230 to 415Vdc	30 A

## • Options

- Battery clips.
- Other current and voltage ranges on request .
- MDBWIN : Driving and capture software of measurements and discharge curves visualization.



# BATTERY CHARGER AND DISCHARGER

12Vdc

8A dc

4x100W

## Battery charger and discharger multiway:

- Discharge power up to 100W per output.
- Discharge current up to 8A per output.

## Simultaneous test of 4 batteries.

Battery maintenance operations requires to operate charge and discharge on batteries. It is helpful to dispose of an equipment able to control the discharge and also to the preprogrammed current.



Picture for illustration purposes only.

MCDB100

### • Packaging

- Box - «Flight case» : L = 535 - P = 320 - H = 460 mm.

### • Main power supply

- 230 Vac Single Phased + Earth - 50/60 Hz.
- Connection by Europa plug - Cord supplied.
- Fuse protected .

### • Control unit

- Microcontroller controlled module with backlight LCD display, status indicating led (discharge, fault,...), function keys and navigation menus, allowing to execute the following operations:
- Selection of the number of batteries.
- Selection of the battery type Plomb or Nickel Cadmium.
- Automatic detection of the batterie voltage (2V to 14V).
- Adjustment of the voltage by 0.1V steps.
- Adjustment of the current by 0.1A steps.
- Adjustment of the charge or discharge time from 1 minute to 10 hours.
- Test start and stop command and status indicated by a led.
- Current measure (accuracy 0.1A).
- Voltage measure (accuracy 0.1V).
- Elapsed time counter.
- Total capacity calculator.
- Serial output RS232.

### • Discharge module

- Electronic control of the discharge current.
- Discharge current from 1A to 8A by 0.01A steps.
- Constant current discharge.
- Discharge current accuracy : 0.1A  $\pm$  1 digit maximum.

### • Charge module

- Selection of the number of batteries.
- Selection of the battery type (Pb or NiCd).
- Electronic control of the battery charge.
- Charge current and voltage accuracy : 0.1A et 0.1V.

### • Protection

- Emergency switch button.
- Protection against electrical and thermal overloads.
- End-charge and discharge voltage control.
- Stop of the test if a problem is detected.

### • Connectivity

- Measure plugs of battery elements :  $\varnothing$ 4mm.
- Cables 2 x 2m - 2.5mm<sup>2</sup> equipped with fuses and clips.

### • References

- MCDB100/4 : 4 Batteries simultaneous.
- MCDB100/3 : 3 Batteries simultaneous.
- MCDB100/2 : 2 Batteries simultaneous.
- MCDB100/1 : 1 Battery.

### • Options

- Other current and voltage ranges on request.
- MCDBWIN : Driving and capture software of measurements and discharge curves visualization.

# CAPTURE SOFTWARE OF BATTERY DISCHARGE CURVES

The MDBSWIN software allows, thanks to an user-friendly and evolutionary graphic interface, the visualization of discharge curves measured during the maintenance and the test of your battery elements :

After the Computer has been connected to the battery discharger, the software will realize, in real time, the acquisition of the differents values to be measured (current, voltage, time...)

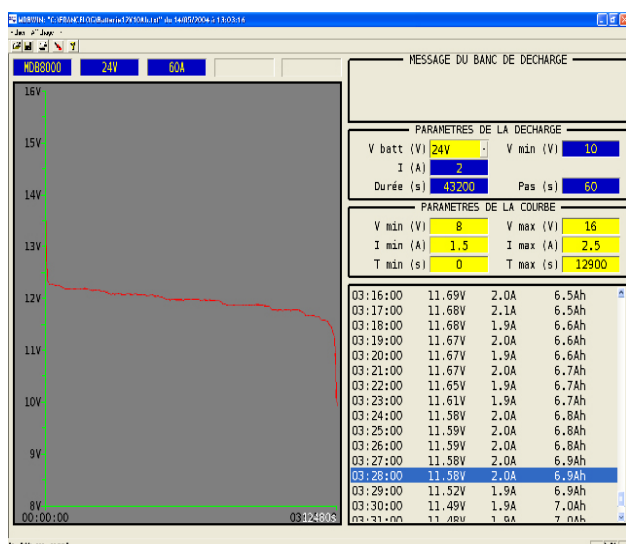


MDBSWIN

Consequently, the MDBWIN software allows to :

- Select the discharge curve parameters.
- Automatically detect the battery voltage.
- Display the discharge current and voltage in real time.
- Display passed time and cumulated capacity.
- Memorize the measured values and curves into files.
- Load and to visualize memorized discharge files.
- Zoom on the curves.
- Compare the new results with old ones.

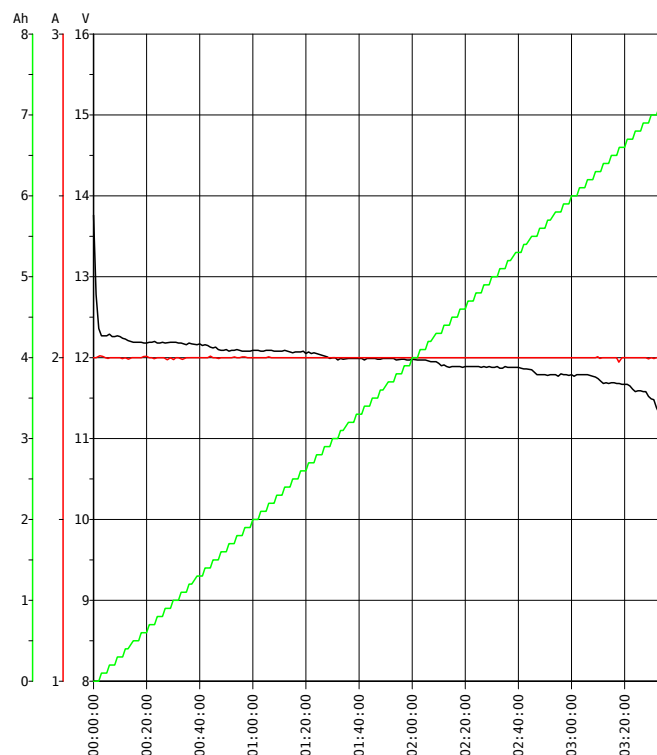
Discharge test reports could be printed or saved on a PC.  
(allowed version : Windows XP/NT/Vista/7).



**DECHARGE "Batterie12V10Ah"**  
**du 14/05/2004 à 13:03:16**

**Courbe client:** FRANCELOG  
**Testeur:** DELPLA  
**Remarque:** A revoir dans un an

**BANC DE TEST:** MDB8000  
**GAMME V :** 24V  
**GAMME I :** 60A  
**V batterie :** 13.80V (en début de décharge)  
**V batterie min :** 10.00V (en fin de décharge si décharge complète)  
**I décharge :** 2.0A  
**Durée max :** 12h00mn00s (43200s)  
**Pas mesure :** 60s  
**V batterie atteinte :** 9.93V  
**Durée atteinte :** 03h35mn00s (12900s)  
**Capacité mesurée :** 7.2Ah



Guarantee one year parts and labor. All interventions are carried out exclusively in our factory.

Due to continuous research program, these characteristics can be modified.

# LABORATORY DC SOURCES

500V

1500A

60kW

Extremely compact, the ALIMLAB design is exceptionally flexible in the outputs it can provide :

- Voltage up to 500 Vdc
- Current up to 1500 Adc
- Power up to 60 000 W

Two user modes available :

- Manual mode
- Driving mode thanks to an analog interface (0-10V insulated or not, IEEE488, RS232, RS485, USB and LAN).

Picture for illustration purposes only.



ALIM SM / HP

## • Packaging

- Rack 19".
- Dimensions : according to models from 1 to 12U x 19" x 440 to 620mm.

## • Main power supply

- 230 Vac Single-phase or 3 x 400 Vac - Earth - 50/60 Hz. (According to models).

## • Technical features

- Usable in constant I or U mode.
- Switching frequency : 100 kHz.
- Power factor correction : 0.98.
- Efficiency : 85%.
- Voltage control  $\pm 0.05\% + 2\text{mV}$ .
- Current control  $\pm 0.1\% + 2\text{mA}$ .
- Response time (10%-90%)  $< 0.5\text{ms}$ .
- Ripple noise :  $< 0.2\%$ .
- Stability : 0.05%.
- Functioning temperature 0 to 50°C.
- Forced cooling system.

References	Power	U out	I out
ALIMSM 105	1000W	0-5V	0-150A
ALIMSM108	1000W	0-8V	0-125A
ALIMSM170	1000W	0-70V	0-20A
ALIMSM1300	1000W	0-300V	0-6A
ALIMSM1500	1000W	0-500V	0-1.6A
ALIMSM220	2000W	0-20V	0-100A
ALIMSM2150	2000W	0-150V	0-15A
ALIMSM2300	2000W	0-300V	0-8A
ALIMSM335	3000W	0-35V	0-90A
ALIMSM3150	3000W	0-150V	0-20A
ALIMSM3300	3000W	0-300V	0-10A
ALIMSM435	4000W	0-35V	0-115A
ALIMSM4150	4000W	0-150V	0-30A
ALIMSM4300	4000W	0-300V	0-15A

Guarantee one year parts and labor. All interventions are carried out exclusively in our factory.

References	Power	U out	I out
ALIMHP540	5000W	0-40V	0-125A
ALIMHP150	5000W	0-150V	0-35A
ALIMHP5300	5000W	0-300V	0-17A
ALIMHP1040	10000W	0-40V	0-250A
ALIMHP10150	10000W	0-150V	0-70A
ALIMHP10300	10000W	0-300V	0-35A
ALIMHP1540	15000W	0-40V	0-375A
ALIMHP15150	15000W	0-150V	0-100A
ALIMHP15300	15000W	0-300V	0-50A
ALIMHP2040	20000W	0-40V	0-500A
ALIMHP20150	20000W	0-150V	0-133A
ALIMHP20300	20000W	0-300V	0-66A
ALIMHP3040	30000W	0-40V	0-750A
ALIMHP30150	30000W	0-150V	0-200A
ALIMHP30300	30000W	0-300V	0-100A
ALIMHP4540	45000W	0-40	0-1125A
ALIMHP45150	45000W	0-150V	0-300A
ALIMHP45300	45000W	0-300V	0-150A
ALIMHP6040	60000W	0-40V	0-1500A
ALIMHP60150	60000W	0-150V	0-400A
ALIMHP60300	60000W	0-300V	0-200A
ALIM SM and HP : Many configurations available on request.			

## • Options

- Blind front face (without display and button).
- Insulated analog interface realising every functions of the appliance.
- RS232 Interface.
- Repacking in « flight case ».
- Other Voltages, Currents and Powers on demand.

Due to continuous research program, these characteristics can be modified.

01/12

# SINGLE AND MULTICHANNEL TIMER

230 Vdc

2000 s

1 to 3  
Chan.

## SINGLECHANNEL CHRONOMETRE : CMV01

- 1 Start input.
- 1 Stop input.

## MULTICHANNEL CHRONOMETRE : CMV03

- 1 Start input.
- 3 Stop inputs.

### 4 Functions of time measurement (maximum, minimum, timer, recloser)

- Digital timer realised on micro-controller technologie basis.
- Automatic recognition of tripping external information by Contact or Voltage up to 230Vcc.

Picture for illustration purposes only.



CMV01 / 03

### • Packaging

- Box - «Flight Case».
- Dimensions : L = 320 - W = 150 - H = 200 mm.

### • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.

### • Multifunction timer module

Microcontroller controlled module with backlight LCD display and function keys allowing to execute the following operations :

- Selection of the timer function (Maximum or Minimum or Chrono or Recloser) allowing to execute the start, the start/stop or the stop by the test case thanks to the On/off key or an external information (contact, voltage).
- Started timer order.
- Measure and display of the time until 2000s (resolution 1ms) with automatic change of decimal point and display of 5 relevant digits.
- Possible restitution of the results on a RS232 output (optional).

### • Chronometre inputs

- 1 start input.
- 3 stop inputs for the CMV03, 1 for the CMV01.
- Optically decoupled inputs which can accept a contact or a voltage until 230Vcc.
- Automatic recognition of voltage state (Voltage present or absent) or contact (opened or closed).

### • Time measure functions

#### • Maximum/Minimum :

Measure the time between the action on the On/Off key and a state change on the selected stop input.

#### • Timer :

Measure the time between a state change on the start input and a state change on the selected stop input.

#### • Recloser :

Measure up to 7 times between the successive changes of states on the timer start input.

### • Synchronized output

- Opto-coupling output - max. capacity : 30 Vcc or 10 mA.
- Output synchronized with the start command (On/Off key), allowing to command an external appliance.

### • Connectivity

- Security plugs Ø4mm for inputs and outputs.

### • Options

- RS232 output.
- **CTRWIN** : Real time capture software of the results on Windows XP/NT/Vista/7.
- Output relays 220Vac/5A instead of the opto-coupling.
- **CMV01/3-SP1** : same as CMV01/3 except that it includes selection switches for start front type and contact or voltage activation type.



# THREE-PHASE FREQUENCY AND PHASE ANGLE METER

600V

60Hz

3U

Three-phase frequency and phase angle meter realized with a micro-controller technology.

- 3 sinusoidal voltage inputs from 0 to 600Vac.

Multifunction digital module allowing to realize the following measurements :

- Frequency of the 3 voltages
- Phase angle between the 3 voltages
- Phase ranking



Picture for illustration purposes only.

FPM 03

## • Packaging

- Box - «Flight Case».
- Dimensions: L=320 - P=150 - H=200 mm.

## • Main power supply

- 230 Vac Single Phase + Earth - 50 /60 Hz.
- Connection by Europa plug - Cord supplied.
- Protected by mini circuit-breaker.
- Measure and display of the time until 2000s (resolution 1ms) with automatic change of decimal point and display of 5 relevant digits.
- Possible restitution of the results on a RS232 output (optional).

## • Multifunction digital module

Microcontroller controlled module with backlight LCD display and function keys allowing to execute the following operations :

### • Frequency of the 3 voltages :

- Measurement of the frequency of the three-phased voltages.
- Display of the 3 frequencies (FU1, FU2 and FU3).  
Measure range from 45 to 60Hz.  
Accuracy : +/- 0.1 Hz.

### • Phase of the 3 voltages :

- Measurement of the phases of the three-phased voltages.
- Display of the 3 phases ( $\phi U1$ ,  $\phi U2$  and  $\phi U3$ ).  
Measure range from -180° to +180°.  
Accuracy : +/- 1°.

### • Phase ranking :

- Measure and display of direct or reverse networks.

## • Measure Inputs

- 3 sinusoidal voltage inputs from 45 to 60Hz.
- 2 Voltage ranges : 0 to 300Vac and 300V to 600Vac.
- Security plugs  $\varnothing$  4 mm.

## • Connectivity

- Security plugs  $\varnothing$  4 mm.

## • Options

- RS232 output.
- **CTRWIN** : Real time capture software of the results on windows XP/NT/Vista/7.

# VARIABLE TRANSFORMER

250V

47A

11KVA

AUTO TRANSFO VAR

From 160 VA to 4 KVA



From 5 to 11 KVA



Pictures for illustration purposes only.

## • Single phase variable transformers :

- Voltage input : 230V - 50/60Hz.
- Voltage output : from 0 to 230V or 250V according to models.
- $I_{nom} = \text{Power} / \text{Output voltage}$ .
- Injection time : Permanent.
- Temperature max. : 80-110°C.

## • Standard et Regulation :

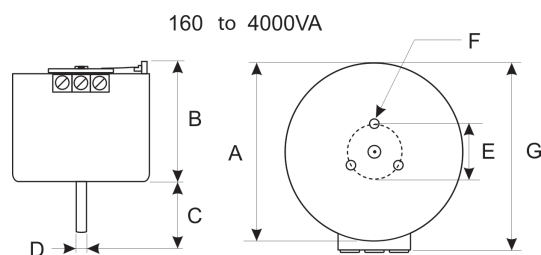
- Directives 73/23 CEE and 93/68 CEE.
- Standards EN60742-89, UNE-EN 61558, UNE-20-339-72, IEC 742.

## • Material :

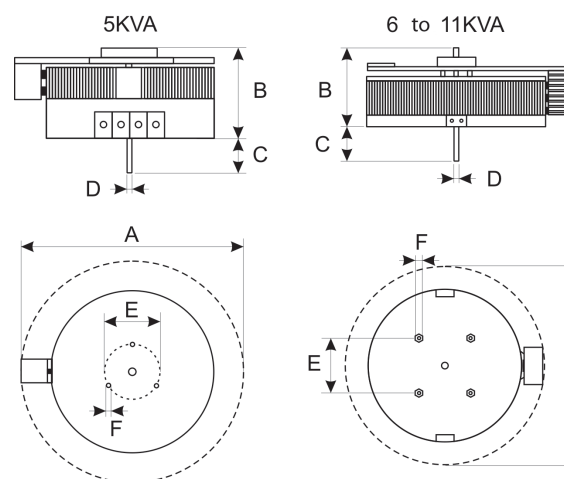
- Winding : Copper HG2.
- Magnetic core : FeSi Grain oriented M5 0.30mm.
- Internal insulation materials : Polyester, Polyamide, Bakelite, Epoxy.

## • Order references :

	Name	Type	Power	Output
	AUTOTRANSFOVAR	MONO	... VA	... VS
Ex :	AUTOTRANSFOVAR	MONO	11 KVA	250 Vac
Ex :	AUTOTRANSFOVAR	MONO	750 VA	230 Vac



VA	In 230 (A)	In 250 (A)	A	B	C	D	E	F	Kg
160	0.7	0.64	80	63	30	6	25	M-4	0.8
220	0.95	0.88	87	67	30	6	25	M-4	1.2
350	1.52	1.4	110	75	30	6	26	M-4	2.5
350 small	1.52	1.4	88	85	30	6	25	M-4	1.9
500	2.17	2	110	80	30	6	26	M-4	2.8
500 small	2.17	2	88	103	30	6	25	M-4	2.4
750	3.26	3	120	90	30	6	33.5	M-6	3.2
1000	4.34	4	120	105	30	6	33.5	M-6	4
1250	5.43	5	130	105	30	6	33.5	M-6	4.6
1500	6.52	6	160	95	35	8	40	M-6	5.7
2000	8.69	8	160	107	35	8	40	M-6	6.8
2500	10.86	10	196	117	40	8	60	M-6	10
3000	13.04	12	226	120	40	8	60	M-6	13.4
4000	17.39	16	250	127	40	8	74	M-8	17



VA	In 230 (A)	In 250 (A)	A	B	C	D	E	F	Kg
5000	21.73	20	320	140	60	10	74	M-8	19
6000	26.01	24	425	170	100	12	80	M-10	32
7000	30.43	28	445	170	100	12	80	M-10	37
8000	34.78	32	490	170	100	12	100	M-10	46
9000	39.13	36	520	170	100	12	100	M-10	55
10000	43.47	40	570	170	100	15	150	M-12	71
11000	47.85	44	610	180	100	15	150	M-12	86

Guarantee one year parts and labor. All interventions are carried out exclusively in our factory.

Due to continuous research program, these characteristics can be modified.

# ACCESSORIES

## CORDS AND PLUGS

500V

15A

U + I

CORDS

PLUGS

ESSAILEC

Picture for illustration purposes only.

### • ESSAILEC cords allows to

- Simplify, securise and accelerate the tests.
- Test in current and voltage of energy counters and protection relays set up on secondary of transformers.
- Test simultaneously 1 to 3 independant circuits connected to the same socket.

### • Technical features

- Voltage up to 500V (IEC 947-1).
- Current up to 15 A.
- Integrated locking system and miswiring protection.
- Functionning temperature : from -10°C to +55°C.
- Identification of the type (U or I) and of the product version thanks to marks and colors.

### • Single-Phased models

- Male Single-Phased Essailec Cords.
- 2 output cables (0, 1).
- Available in Current and Voltage version.

### • Three-Phased Models

- **Male or female Essailec cords :**
  - Available in Voltage and Current version.
  - Available in Version Essailec/4 and Essailec/8.

### • Versions for Three-Phased models only :

- **Cords Essailec/4 :**
  - 4 output cables (01,02,03,04).
  - On the current cord, outputs (1,2,3,4) are short-circuited all together internally.
  - On the voltage cord, outputs (1,2,3,4) are unused.
- **Cords Essailec/8 :**
  - 8 output cables (1,2,3,4,01,02,03,04).
  - No internal pre-wiring.

### • Options :

- Specific cords on request.
- Other cable sections on request.

### • ESSAILEC plugs allows to

- Simplify, securise and accelerate the tests.
- Test in current and voltage of energy counters and protection relays set up on secondary of transformers.
- Test simultaneously 1 to 3 independant circuits connected to the same socket.

### • Technical features

- Voltage up to 500V (IEC 947-1).
- Current up to 15 A.
- Integrated locking system and miswiring protection.
- Functionning temperature : from -10°C to +55°C.
- Identification of the type (U or I) and of the product version thanks to marks and colors.

### • Three-Phased Models

- Three-phased Male Essailec plugs.
- Available in Voltage and in Current version.

### • 2 Versions

#### • Essailec/4 plugs:

- 4 Security plugs ø4mm (01,02,03,04).
- On the current plug, outputs (1,2,3,4) are short-circuited all together internally.
- On the voltage plug, outputs (1,2,3,4) are unused.

#### • Fiches Essailec/8 :

- 8 Security plugs ø4mm (1,2,3,4,01,02,03,04).
- No internal pre-wiring.

### • Option :

- Specific plugs on request.
- Voltage outputs proportionnal to primary current (using measurement torus 5A/1V or 5V).

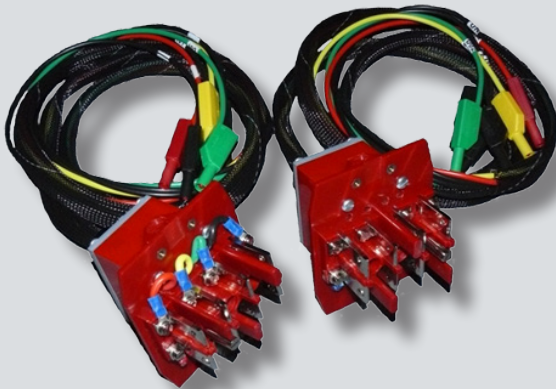
# ACCESSORIES

## CORDS AND PLUGS

500V

15A

U + I



CORDS

Picture for illustration purposes only.



PLUGS

SECURA

### • SECURA cords allows to

- Simplify, securise and accelerate the tests.
- Test in current and voltage of energy counters and protection relays set up on secondary of transformers.
- Test simultaneously 1 to 3 independant circuits connected to the same socket.
- Realise securised tests.

### • Technical features

- Voltage up to 500V (IEC 947-1).
- Current up to 15 A.
- Integrated locking system and miswiring protection.
- Identification of the type (U or I) and of the product version thanks to marks and colors.

### • 2 Versions

#### • Secura/4 cords

- 4 Output cables (01,02,03,04).
- On current cords, outputs (1,2,3,4) are short-circuited.
- On voltage cords, outputs (1,2,3,4) are unused.

#### • Secura/8 cords

- 8 output cables (1,2,3,4,01,02,03,04).
- No internal pre-wiring.

### • Options :

- Specific cords on request.
- Other cable sections on request.

### • SECURA plugs allows to

- Simplify, securise and accelerate the tests.
- Test in current and voltage of energy counters and protection relays set up on secondary of transformers.
- Test simultaneously 1 to 3 independant circuits connected to the same socket.
- Realise securised tests.

### • Technical features

- Voltage up to 500V (IEC 947-1).
- Current up to 15 A.
- Integrated locking system and miswiring protection.
- Identification of the type (U or I) and of the product version thanks to marks and colors.

### • 2 Versions :

#### • Secura/4 plugs :

- 4 Output plugs Ø4mm (01,02,03,04).
- On current plugs, outputs (1,2,3,4) are short-circuited.
- On voltage plugs, outputs (1,2,3,4) are unused.

#### • Secura/8 cords

- 8 Output plugs Ø4mm (1,2,3,4,01,02,03,04).
- No internal pre-wiring.

### • Option :

- Specific plugs on request.
- Voltage outputs proportionnal to primary current (using measurement torus 5A/1V or 5V).